

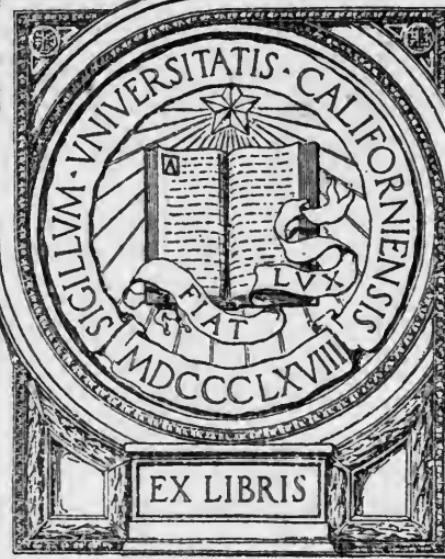
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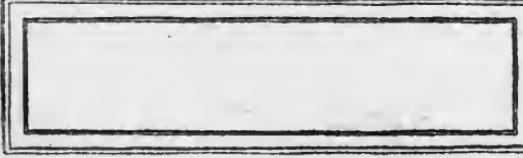
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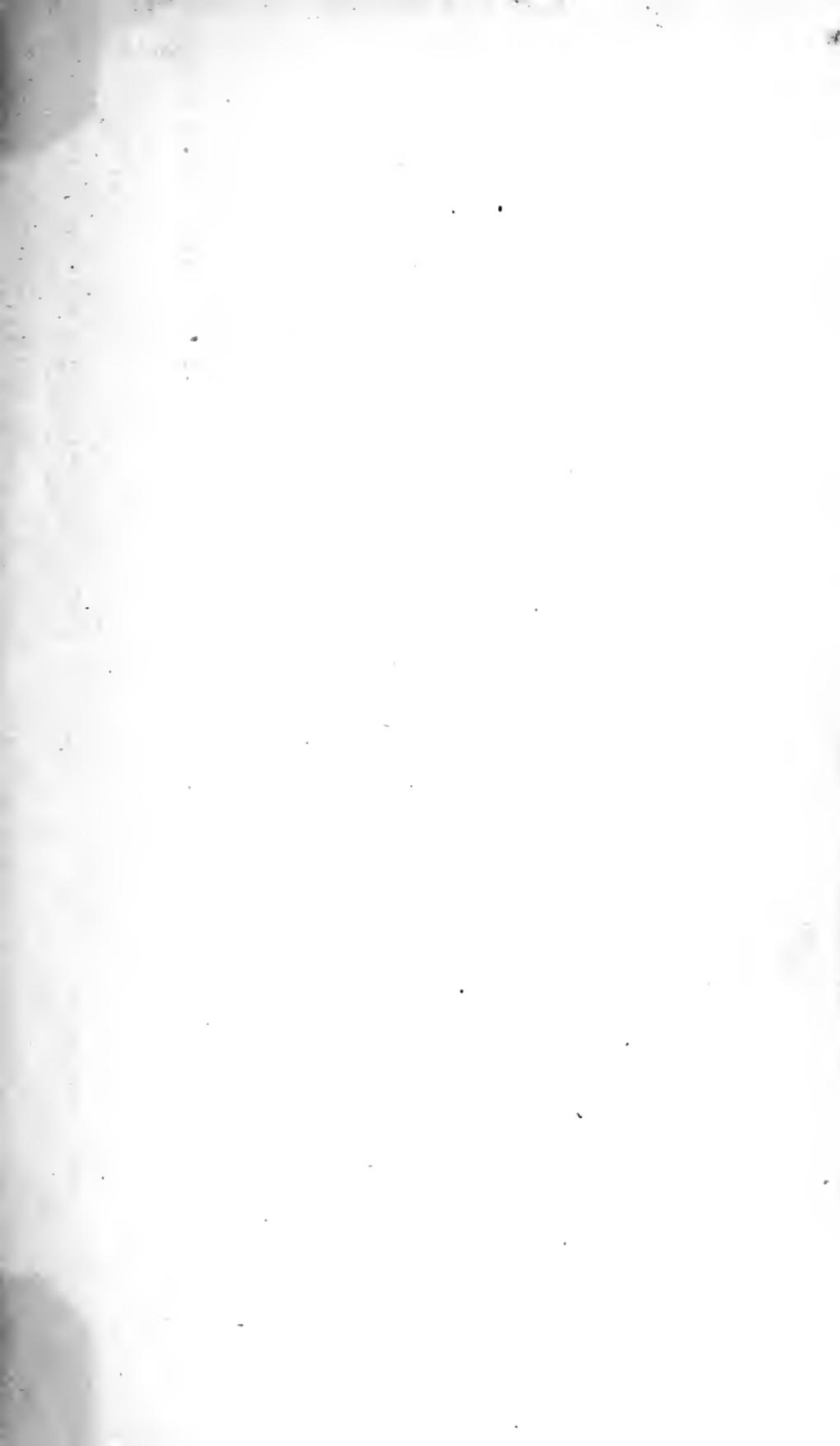
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SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XVI.

THE DEKALB SILT LOAM.

BY

JAY A. BONSTEEL,
Scientist in Soil Survey.



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SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XVI.

THE DEKALB SILT LOAM.

GEOGRAPHICAL DISTRIBUTION.

The Dekalb silt loam is an extensive and important soil type, occurring in the Appalachian Mountain and Plateau region of the United States from northern Alabama to north-central Pennsylvania and from the western part of Virginia to southern Indiana. Areas of this soil have been encountered in 19 different soil surveys, made in 8 different States, and a total area of 1,122,944 acres has been mapped.

The widespread distribution of the type and its general occurrence throughout a broad area is thus indicated, and it is probable that the Dekalb silt loam is both the most extensively developed and, agriculturally, the most important soil type of the higher portion of the Allegheny Plateau and Mountain sections. It is found chiefly at the higher elevations, upon flat-topped ridges and extensive fragments of the plateau not occupied by the crystalline rocks.

CHARACTERISTICS OF SOIL AND SUBSOIL.

The surface soil of the Dekalb silt loam is a mellow and friable silt loam to an average depth of 8 or 10 inches, though not infrequently the soil has a depth ranging from 14 to 20 inches. The color of the surface soil varies considerably in different areas where it has been encountered, but is generally a gray, brown, or yellow. The color is liable to be gray or brown in wooded areas, brown to yellowish brown in well-tilled fields, and light gray or pale yellow in fields which have been long under cultivation with little attention paid to the maintenance and restoration of organic matter.

The subsoil is usually a yellow or mottled yellow and gray heavy silty loam which grades downward into a stiff and compact silty clay loam or clay below 24 inches in depth. In many instances the deeper subsoil is tinged with red or has an increasingly reddish color. Only in poorly drained areas is the mottling of the deep subsoil common, and in such instances the colors are pale yellow and drab, gray, or almost white. The red coloration is always indicative of

better drainage and usually of a more productive development of the type.

In many areas there are found, scattered throughout both soil and subsoil, many small fragments of sandstone and of sandy shale, neither large enough nor sufficiently numerous to impede cultivation. These are fragments of the parent rock from which the soil type has been derived. Larger fragments are locally found upon steeper slopes within and bordering the Dekalb silt loam, but where the accumulations of stony material are important, either in number or in extent, the resulting soil has usually been separated as the Dekalb stony loam.

The Dekalb silt loam is chiefly derived from fine-grained sandstones and from sandy shales, principally of Carboniferous age, though other shales and sandstones of the same general nature and of the same region have given rise to certain areas of the type. In a few instances only have narrow bands of limestone contributed to the materials composing the Dekalb silt loam.

The Dekalb silt loam and its associated soils of the same series may easily be distinguished from the majority of the other soils of the regions where they occur through the fact that they are prevailingly gray or brown at the surface and at greater depths are characteristically yellow. They thus differ from practically all of the other soils of the region which are also derived from sandstones and shales, since the latter possess prevailingly red or reddish-brown subsoils. The red color is only found in the deepest portions of the subsoil of the Dekalb silt loam over areas of rather limited extent.

SURFACE FEATURES AND DRAINAGE.

Normally the surface of the Dekalb silt loam is gently rolling to nearly level. It is found as the surface of broad plateau areas and of the level tops of ridges and broad mountains. There are certain areas of the type, to be found chiefly where erosion has deeply dissected the Appalachian Plateau Region, which consist of knobs and flat-topped hills with their adjoining slopes. These areas are more rolling or even hilly and sloping, but their extent is limited when compared with the total area of the type. There are also some regions where the type is developed upon sandstone ledges or benches, somewhat below the elevation of the upland but well above the bottoms of the adjoining valleys. Only in a few areas does the Dekalb silt loam occupy valley positions and these are not typical of this soil either in coloration, drainage, or principal crop adaptations. The materials from which such areas are derived are, however, characteristic of the type and the difference in topography and drainage is chiefly responsible for these departures from the normal condition.

The Dekalb silt loam exists through a wide range of elevation, as might be anticipated in the case of a plateau and mountain soil of such wide distribution. In southern Indiana and in Kentucky the surface of the type is only about 750 to 800 feet above sea level. From this low altitude the main development of the type rises eastward through the Plateau Region to altitudes of 2,000 feet or more in eastern Tennessee, northern Alabama, and north-central Pennsylvania. Probably the greater proportion of the type is to be found at altitudes between 1,000 and 1,800 feet above tide level. Thus, even in more southern localities, the Dekalb silt loam is found under climatic surroundings which give to it an agricultural value more consonant with more northern localities; while in the northern regions of its occurrence some portions of the type are actually found above the altitudes at which the staple farm crops may be grown to advantage.

The majority of the areas of the Dekalb silt loam are well drained. This is chiefly due to the generally elevated position of the type, to the fact that there are usually accumulations of sandstone and sandy shale fragments in the deeper subsoil, and to the additional fact that it normally rests upon a bed of sandstone from which it is chiefly derived. There are, however, many small local areas and some considerable tracts, chiefly those to be found in valley positions, which are marked by stiff, clayey, mottled, and poorly drained subsoils, and which would be decidedly benefited by artificial drainage. Such areas are either found to be in forest or else, where they have been cleared, they are chiefly utilized for pasturage purposes. Generally the drainage of the Dekalb silt loam is excellent, and there is more liable to be difficulty from a deficiency of moisture during the growing season than from excess.

Upon the more sloping areas of the Dekalb silt loam and frequently around the margins of any area of the type there is liable to be some difficulty experienced on account of erosion. The major streams which flow out from the Plateau and many of their smaller tributaries have trenched deeply into the upland surface, and the headwaters of all of these streams are eroding rapidly. There is a constant tendency, thus, to invade the more level plateau surface and toward the removal of both soil and subsoil material. Within the larger areas of the type there is little danger from erosion, owing to the level or gently rolling surface of the soil. In order to prevent the further destruction of areas of the type from marginal erosion, it is most desirable that all steeply sloping areas should be left in forest and woodlot or devoted, upon the gentler slopes, to the production of grass for pasturage. Under cultivation the soft, silty soil is otherwise easily removed by flowing water.

LIMITATIONS IN USE.

That the proper uses of the Dekalb silt loam are somewhat restricted under present conditions surrounding the greater part of the type is well shown by the large proportion of it which still remains in forest. There are several reasons why this type has not been more extensively cleared and tilled.

A large part of the more eastern development of the Dekalb silt loam is to be found at considerable elevations, upon the crests of high ridges or upon the summits of the plateau lands. These areas are not particularly accessible, either for the purposes of obtaining the supplies for the farms or for the purposes of disposing of bulky farm products. The roads are infrequent and very often of steep grade between the farm and the market place. In northwestern Pennsylvania and in eastern Tennessee and northern Alabama this fact has prevented the extensive occupation of the type even after it had been largely cleared of its original forest growth. At lower altitudes, as in West Virginia, Kentucky, Ohio, and Indiana, the Dekalb silt loam is found nearer to the established lines of transportation and of highway communication. In all such areas a much larger proportion of the type has been cleared and brought under cultivation. This establishes the fact that altitude and lack of transportation have been among the chief obstacles to the more extended use of the type.

The high altitude of large portions of the type has also been responsible for other limitations upon the use of the Dekalb silt loam. In its more northern localities, in north-central Pennsylvania, the season is usually too short to permit of the maturing of corn for grain, and this crop is eliminated. In such localities buckwheat, oats, and timothy are the only crops which may be extensively grown, with potatoes as a supplementary crop. Farther to the south the climatic surroundings are so changed that even cotton may be grown, with limited success, upon the type, and there the oats and even wheat of the intermediate regions do not thrive because of climatic environment. Thus, in various parts of its broad extent, the Dekalb silt loam is limited in its uses to those crops which may be appropriately grown under the existing climatic conditions. The limiting factor of climate is usually that of temperature, as expressed both by length of growing season and by the mean temperatures during the periods when the crops occupy the land, since the attendant rainfall is commonly adequate.

In all regions where it occurs, under such extraneous conditions as to render agricultural occupation desirable, the Dekalb silt loam is limited to the production of the staple farm crops through its textural characteristics. While the surface soil is mellow and easily tilled over a considerable part of the extent of the type, the subsoil is usually

dense and somewhat retentive of moisture during the early part of the season, with a tendency toward excessive drying out during later periods. As a result the small grains and grass make more satisfactory growth than either corn or the special crops, like orchard fruits, berries, and garden vegetables. The production of these crops is not essentially impossible, however, if proper attention is paid to the subsoil drainage of the type and to the incorporation of organic matter. This has been proved by the success of many farmers in West Virginia and Pennsylvania, who have been led, by the presence of special markets in the mining and industrial regions, to the local growing of tree fruits, small fruits, and quite a variety of market-garden vegetables. Thus, poor drainage and a lack of organic matter in the surface soil, while limiting the uses of considerable portions of the Dekalb silt loam, may be sufficiently remedied to enable the farmer who possesses such special markets to increase the range of crop adaptations far beyond the general possibilities of the type. Under normal conditions, however, the Dekalb silt loam is better suited to produce the staple crops of the region in which it occurs than it is to the growing of special crops.

IMPROVEMENT IN SOIL EFFICIENCY.

Since in nearly every area where the Dekalb silt loam has been encountered to any extent it has been best used for the production of the general farm crops of that region, there can be little to suggest as to the improved selection of crops for the type beyond recording those crops which are most uniformly successful under the various climatic conditions within which the type is found. Thus, in the more northern and also in the more elevated portions of its development, the Dekalb silt loam is suited to the production of buckwheat, rye, Irish potatoes, oats, and timothy and redtop. It is not usually a successful clover soil and only the alsike may be depended upon unless the soil is rather heavily limed before the clover is seeded in. For pasture purposes the timothy, redtop, and alsike or white clover must be depended upon. The Canada bluegrass is native to this soil in all of its more northern occurrences, and it makes fair pasture in the earlier part of the season.

In southwestern Pennsylvania, and thence southward, corn is successfully grown upon the Dekalb silt loam and buckwheat disappears as a profitable or certain crop except at the higher elevations. In the territory from the vicinity of Johnstown, Pa., southward to eastern Tennessee, corn, wheat, oats, and hay should constitute the chief reliance of the farmer who is tilling the Dekalb silt loam. Irish potatoes are also grown to advantage upon the best drained portions of the type, especially if the surface soil is well supplied with

organic matter and is somewhat more sandy than the average. In this climatic region also the Elberta peach is grown to advantage on the Dekalb silt loam, and such apples as the Ben Davis, Gano, and Arkansas Black-twigs may be planted.

The adoption of such crop adaptations as these for the Dekalb silt loam would render profitable the cultivation of considerably greater areas than are now tilled.

For the improvement of crop yields upon areas now tilled it is probable that the restoration of organic matter and the application of lime are the chief requisites. There is no better method for increasing the organic matter content of the surface soil than by the application to the tilled fields of all the stable manures made upon the place. This is done where stock raising is at all prevalent, but over the greater part of the Dekalb silt loam no attention is paid either to stock production or to the manuring of the land. As a result, in all of the more southern regions where the type is developed, recourse is had to the use of small amounts of commercial fertilizers each year upon the land in crops and no effort is made to maintain or to restore the organic matter of the surface soil. Consequently the fields are frequently of a pale yellow color and the silty surface soil is baked and clodded and in poor physical condition for the retention of soil moisture. With such circumstances the soil has acquired the reputation of being droughty and is so little esteemed that areas which have once been cleared are not infrequently abandoned to reforestation.

This treatment is merely a survival of pioneer methods of land exploitation and should give place to the proper selection of crops suited to the soil, to regular crop rotations, and to the careful use of all available supplies of organic manures.

Where stock raising is not a part of the system of farming and, consequently, stable manures are not available, certain green crops should be grown for the sole purpose of being turned under to restore the organic material to the surface soil. In all of the more southern locations cowpeas, hairy vetch, and bur clover are available, while farther north medium red clover grown in the regular rotation is best suited for this purpose. Buckwheat may be so used at the higher altitudes.

Frequently it is necessary to apply lime to the Dekalb silt loam before any successful stand of red clover may be obtained. For this purpose the burned stone lime is altogether the best and it should be applied, 10 days or 2 weeks before the seeding, at the rate of 1,500 to 2,000 pounds per acre and immediately harrowed into the surface soil to a depth of not less than 3 inches. Lime may be applied at any point in the rotation except immediately in advance of the planting of a potato crop. The best place is, usually, just before

the seeding to a small grain and the accompanying sowing of the clover seed.

In many areas the mechanical condition of the surface soil is poor and the present depth of plowing is altogether too shallow for successful crop production. Considerable care is required for the preparation of this silty soil, especially in all cases where the amount of organic matter in the surface soil is deficient. If fall plowed to a shallow depth the autumn and spring rains are liable to compact the furrows to such an extent that the land should be refitted in the spring. Consequently, where the land is not to be used until the following spring, fall plowing should not be undertaken as a usual practice. Immediately after the land has been plowed it should be harrowed to form a surface covering against evaporation, since the Dekalb silt loam is liable to give trouble from drought during the later summer months unless every precaution is taken to preserve soil moisture.

In many areas where the Dekalb silt loam has been mapped the normal depth of plowing is only 2 or 3 inches. This is totally inadequate to give satisfactory crop yields. The depth of plowing in such cases should be gradually increased, especially for the inter-tilled crops, until it reaches 6 inches or more. If, at the same time, organic matter is carefully added it will result in a very decided increase in crop production.

Locally, there are areas of the Dekalb silt loam which would be benefited by drainage. It would scarcely be wise, in many instances, to invest large sums in the drainage of this land until it has attained a greater value in the areas where it is encountered. There is usually an abundance of land and only near to markets or where the undrained tract constitutes a portion of an otherwise well-drained farm should underdrainage be resorted to. The greater part of the type possesses excellent natural drainage.

LIMITATIONS UPON SPECIAL CROPS.

The geographic location of the different areas of the Dekalb silt loam with respect to markets and to transportation controls to a considerable degree the character of the crops which may best be grown upon it. Throughout the greater portion of its extent the Dekalb silt loam is distinctly a soil of the higher plateau and mountain sections. Neither rail nor highway transportation is fully developed and, in general, the local markets for special crops, like garden vegetables and fruits, are lacking. This limitation does not apply, however, to extensive tracts of the type which are developed in south-central and southwestern Pennsylvania and in neighboring sections of West Virginia. In this general region the growth of the coal-mining industry and of the manufacturing interests associated with

it furnish local markets for practically all of the fresh vegetables and the fruits which may be grown. In fact, at the present time, extensive shipments of such farm commodities are made into this region. As a consequence there exist excellent opportunities for the development of more intensive forms of agriculture upon the Dekalb silt loam of this region. At present the areas of the type are nearly equally divided between tilled fields, pasture, and woodlots. Corn, oats, buckwheat, wheat, potatoes, and grass are the chief crops.

The Dekalb silt loam is an excellent type of soil for the production of Irish potatoes; it is well suited to the growing of cabbages; there are numerous varieties of apples which may be produced to advantage if properly drained sites for the orchards are selected; even the common farm crops now raised upon the type may be so utilized as to lead to the development of profitable dairy industry and to the raising of sheep and swine as a supplement to the sale of the dairy products and of the fruits and vegetables which may well be grown upon it in such localities as possess the necessary local markets.

In consequence of these adaptations of the Dekalb silt loam under the influence of good local markets, it is desirable that large areas of the type in south-central and southwestern Pennsylvania should be developed upon the basis of a combined general and special farming. The existence of portions of the type too rough or too remote from transportation to justify intensive development would indicate the desirability of sheep raising and of grazing as the best form of occupation for such lands. The possibility that each farm may support small orchards of apple, cherry, and plum trees as a supplement to other forms of farming; the ability of the soil to produce excellent crops of potatoes and cabbages as "money crops"; the ready sale of dairy products at excellent prices; these conditions should all lead to the diversification of cropping and of farm development upon the Dekalb silt loam in the vicinity of the Pittsburgh mining district and in near-by industrial sections. The markets are excellent and the necessary transportation to market exists.

Elsewhere in the plateau and mountain sections, because of lack of near-by markets, dependence must be placed upon the production of those general farm crops which are suited to such a silty soil and to the local conditions of climate. For the central portion of the region, from northern West Virginia to eastern Tennessee, the crops best suited to production upon the Dekalb silt loam are corn, winter wheat, oats, and timothy and alsike clover for hay production. In addition, there are many thousands of acres of the type suited to the growing of the Elberta peach where market facilities may be had and where the soil and air drainage as well as the exposure of the orchard sites are proper. Thus, in the central region of its development the Dekalb silt loam is limited by its altitude and its relation to trans-

portation to the production of general farm crops. Farther to the south, in southern Tennessee and in north-central Alabama, cotton may be produced at the lower elevations, while winter wheat, winter oats, and grasses may also be grown. In general, however, cotton is not particularly successful upon the Dekalb silt loam, since the high altitude at which it is found places it outside the climatic zone best suited to this crop. It would be better to develop the type as a general farming soil devoted to the growing of the cereals and to grass production, with supplementary grazing and dairy interests. Particularly in the vicinity of the Alabama coal-mining cities and the industrial district of northern Alabama and south-central Tennessee would it be desirable to devote a considerable area of this type to dairying and to meat production. Here, also, the growing of garden vegetables and small fruits would be profitable, as in the Pittsburgh district. Such development has been begun near Birmingham, Ala.

While there are thus local limitations and conditions which vary the crops which may most profitably be grown upon the Dekalb silt loam, still it is a very fair general farming soil in all locations except at the highest altitudes in the most northern regions of its occurrence. In other locations, where the climatic limitations do not prevent and where there is proper transportation, the Dekalb silt loam may also be utilized for the production of garden vegetables and small fruits. Under favorable conditions of exposure, drainage, and transportation it may also be used for the growing of Elberta peaches. Apples may be grown upon the type, particularly in the West Virginia-Pennsylvania region.

EXTENT OF OCCUPATION.

In the more elevated sections where it is developed, both in the Mountain and in the Plateau Regions, there are very extensive areas of the Dekalb silt loam which are still undeveloped agriculturally. Such areas are either in forest, chiefly oak and chestnut, or have been cut over and are grown up to brush. Particularly upon the level crests of mountain ridges and upon the smaller fragments of the plateau, where the margins of the type are bounded by steep slopes or almost perpendicular cliffs, does this wooded or brushy condition persist. The inaccessibility of such locations precludes their agricultural occupation.

In localities where the type is developed at lower altitudes and in more accessible situations the percentage of agricultural occupation increases until in certain of the localities where it has been mapped in West Virginia and southern Pennsylvania, fully 80 per cent of the type is used for some form of farming, including the pasturing of cattle and of sheep.

At the lower levels, in Kentucky and in Indiana, the type is largely occupied for the production of grains and of grass. In fact, roughness of topography and inaccessibility, even of the smoother individual areas, alone prevent the general use of the Dekalb silt loam as a secondary agricultural soil. There still remain great tracts suited for farm purposes when proper transportation to and from the farm shall be provided. To the present time, however, occupation has not infrequently flowed by the higher lying areas of the Dekalb silt loam to cover the more accessible valley soils.

CROP ADAPTATIONS.

A definite distinction must be made between the present crop uses of the Dekalb silt loam in the various regions in which it occurs and those uses of which it is capable under a more intensive system. The Dekalb silt loam is still tilled under primitive, pioneer conditions throughout a considerable portion of its extent. So the crop yields reported from this type are usually low when compared with State or county averages, and its real value as an agricultural soil is only shown in those regions where better and more modern methods have been adopted under the stimulus of excellent local markets. The ultimate possible uses of the type have been discussed under the previous headings. The present adaptations, as developed by the different communities where the type has been encountered, will be summarized.

Corn is produced upon the Dekalb silt loam in practically all regions where it is farmed, except in the more northern localities and at the highest altitudes. In no case is the acreage devoted to corn of high rank when compared with that given to small grains and to grass. In Alabama the yields per acre are extremely variable, depending chiefly upon the care given to the preparation of the land and to the tillage of the crop. Yields as low as 5 bushels per acre are reported, while returns of 40 bushels have been secured. For the average of the type a yield of 15 to 20 bushels may be considered normal. In Ohio and Indiana, at somewhat lower altitudes but in more northern latitude, the yields range from 20 to 60 bushels per acre with a general average for the type of about 25 bushels. Again the care of the soil and the tillage of the crop seem to be the most important factors in increasing the yields. In Tennessee and Kentucky corn yields from 10 to 30 bushels per acre upon the Dekalb silt loam with an average production of about 20 bushels. In Virginia and West Virginia and at the lower altitudes in Pennsylvania the yields range from 15 to 40 bushels per acre, with an average production of about 25 bushels. Thus throughout the extent of the type there are wide variations in the yields of corn secured, and these point

inevitably to the conclusion that inefficient methods of soil management—failure to restore organic matter to the surface soil, insufficient depth of plowing, and infrequent and improper tillage—are chiefly responsible for the lower yields.

Winter wheat is grown as a small grain crop upon the areas of the Dekalb silt loam from southern Pennsylvania to northern Alabama and westward to southern Indiana. Again the yields are extremely variable. In Alabama 5 to 8 bushels is the common production. In Kentucky the yields range from 8 to 15 bushels. About the same quantity is raised in Indiana and Ohio, though yields of 20 to 25 bushels are also reported. The soil is well suited to the production of a good quality of winter wheat at the higher altitudes in the more southern areas of its development and at all altitudes in the middle region. In the more northern localities wheat should give place to oats.

Oats are grown as a summer crop in all of the more northern areas where the Dekalb silt loam has been mapped. They are sparingly grown as a winter crop in Alabama. In all cases the yields are low compared with those of other types of soil occurring in the region. Yields of 20 to 25 bushels are most common, though some farmers are reported to produce 30 to 40 bushels per acre. Even in the most favorable localities it is not probable that the average yields of oats upon the Dekalb silt loam exceed 25 bushels per acre. In the southern localities the oats are not thrashed, but are grazed off or fed in the bundle.

The usual seeding to grass upon the Dekalb silt loam is chiefly to timothy for hay, although clover is successfully grown, alone or in mixed seeding, in some areas. There has been some difficulty experienced in securing a stand of clover in many localities, and this may only be overcome by the application of lime to the land at the time of the clover seeding. Elsewhere the stand secured is usually irregular and only lasts for a single year. The yields of timothy hay from the Dekalb silt loam are unusually good. They range from 1 ton per acre to $1\frac{3}{4}$ tons under favorable climatic conditions and upon the better tilled fields. Large areas of the type are also maintained in pasturage, and these pastures are principally overgrown to native grasses with a small amount of timothy and redtop. In the case of both meadows and pastures the seeding is usually allowed to stand altogether too long, decreasing both the quantity and quality of the grasses produced. For pasturage purposes a mixture of timothy, redtop, Canada bluegrass, alsike, and white clover produces a good turf and an enduring pasture. It is frequently not necessary to plow old pastures to secure a stand of grasses. These may be sown upon the surface of the land after it has been harrowed and scarified

to allow a catch of the seed. A light top-dressing of stable manure in addition will assure a fair to good seeding.

Tobacco is grown to a very limited extent upon a single area of the Dekalb silt loam in Kentucky. The yields are low, averaging about 600 pounds per acre, and the extension of the crop may not be recommended. Irish potatoes are usually grown to a limited extent upon the Dekalb silt loam chiefly for home consumption, though in southwestern Pennsylvania they also constitute a market crop. The yields secured are extremely variable, ranging from 50 to 250 bushels per acre. The soil, where well drained, is well suited to the production of this crop, and in localities where the local market is good potatoes should constitute one of the chief money crops. It will be necessary to pay careful attention to the restoration of organic matter to the soil wherever the crop is to be produced upon a commercial scale. For this purpose a crop of buckwheat should be grown in all of the more northern areas and then turned under in the fall to be allowed to rot before the potatoes are planted in the succeeding spring. Then a commercial fertilizer high in potash salts, preferably the sulphate, should be applied at the rate of not less than 500 pounds per acre. If well-rotted stable manure is also available it should be broadcasted over the field well in advance of the plowing for the crop. If such precautions are taken the yield of potatoes will usually recompense the extra expense of the preparation of the land if proper care is also taken in the spraying and tillage of the crop.

Fruit crops.—In the States of Tennessee and Alabama and even in some portions of West Virginia and Pennsylvania there are local areas of the Dekalb silt loam which are suited to the production of Elberta peaches upon a commercial scale. All such areas are possessed of good soil and subsoil drainage, are located so that they are not exposed to cold winds and storms of unusual severity, and are so situated as to secure good air drainage. Also, the depth of soil and subsoil over the underlying rock must be not less than 3 feet. Wherever the type is underlain by stiff, heavy, silt loam or clay loam at shallow depths, the planting of peaches should not be undertaken. It is evident that the localities should also be possessed of adequate transportation facilities to market points.

While not a particularly desirable apple soil, areas of the Dekalb silt loam in the southwestern Pennsylvania region may be used for apple orcharding if the same peculiarities of location and of drainage required elsewhere for peaches are secured. In addition care should be taken to select areas remote from the fumes of coking ovens and where the operations of mining coal will not cause the caving-in of the orchard site. The Baldwin is better suited to production upon this type of soil than the majority of other apples. It should only be planted upon areas which possess deep, mellow soil and subsoil

and never where there is poor subsoil drainage or a stiff, compact subsoil layer near to the surface of the land. In the more northern localities in Pennsylvania the Northern Spy also does well. It is only upon the portions of the type which grade toward the fine sandy loam that the Rome Beauty is best grown and then at the lower elevations. Ben Davis and Gano may be grown in West Virginia and in more southern localities.

A wide variety of small fruits may be grown upon the Dekalb silt loam both for home use and for market supply where such demands exist. The later varieties of strawberries yield well both in respect to quantity and to quality. Raspberries may be grown and blackberries are particularly successful upon areas of some elevation in the more northern regions. Local market demands should rule the classes of small fruits to be planted.

Market-garden crops.—Potatoes should constitute the chief market-garden crop upon the Dekalb silt loam wherever the local market conditions justify their production. The precautions necessary to secure a favorable yield have been discussed under general farm crops.

Cabbages may also be grown to advantage both for local sale and for shipment. Usually it will be better to apply lime to the soil before a cabbage crop is attempted, and the land should be in a good condition of general fertility and should be well prepared with deep plowing and good tillage.

Beets, turnips, and other root crops may be grown to advantage where a local market for them exists.

SUMMARY.

The Dekalb silt loam is an extensive soil type occurring principally upon the higher elevations of the Appalachian Plateau and upon the flat crests of the broader mountain ridges of the Appalachian Mountain system. In altitude it ranges from about 700 feet above sea level, where it occurs upon the lower slopes of the plateau region in Ohio and Indiana, to altitudes in excess of 2,000 feet upon the higher ridges and fragments of the plateau in north-central Pennsylvania.

The surface of the type ranges from almost level and gently rolling to hilly and rough. Its natural drainage conditions are usually adequate, though there are areas in low-lying positions and remote from streams which are too wet for profitable agricultural occupation.

The surface soil is a soft, silty loam of a prevailing gray or pale yellow color. The subsoil is a heavier and more compact silt loam or silty clay loam, which is usually mottled yellow and gray or ash-colored, though in particularly well drained areas of considerable depth of soil and subsoil the deeper subsoil may show a reddish tinge.

The Dekalb silt loam is primarily a general farming soil whose crop adaptations vary with the climatic surroundings which may

locally prevail in the different areas where it is found. In the more northern and also the more elevated locations, buckwheat, oats, and grass are the chief crops. Under conditions of longer growing season, corn, winter wheat, oats, and grass are the chief crops. Locally, in more southern areas, cotton is grown to a limited extent and with low yields. Tobacco is grown only in one locality thus far encountered and the extension of the crop may not be recommended.

In certain of the more northern localities apples may be grown commercially upon the Dekalb silt loam if certain precautions with regard to air and water drainage are observed and the selection of varieties suited to the climatic surroundings is made.

Peaches may be grown in selected localities from West Virginia southward.

Potatoes should constitute an important crop upon the type where local markets are available for their sale. Cabbages are also an excellent market-garden crop. Root crops may be grown.

The chief requirements of the Dekalb silt loam to improve its efficiency are increased organic matter in the surface soil; increased depth of plowing; greater care in the tillage of all intertilled crops; and, locally, the drainage of portions of the tilled fields, marked by mottled and impervious subsoils.

Large areas of the Dekalb silt loam have never been brought under cultivation because of inaccessibility, and these are still covered with hardwood forests or with scrubby growths of brush.

Because of inaccessibility and of the general rather than special crop adaptations of the Dekalb silt loam, extensive areas of the type should be given over to grazing interests, particularly to the grazing of sheep.

Dairying has proved profitable upon areas of the type suitably located with respect to markets for dairy products. The raising of swine and of veal calves in this connection adds to the profits to be derived from the dairy industry.

Not nearly all of the area of the Dekalb silt loam is now occupied for agricultural purposes, and the extension of farming upon the type waits upon the provision of adequate transportation by highway and rail.

Crop yields upon the Dekalb silt loam are exceedingly variable and are chiefly dependent upon the skill of the individual farmer in the preparation and management of the soil.

Considerable areas of the Dekalb silt loam in more inaccessible positions should be developed systematically as permanent forests.

Approved:

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., June 26, 1911.

APPENDIX.

The following table shows the extent of the Dekalb silt loam in the areas surveyed to this time.

In the first column is stated the particular survey in which the soil was encountered; in the second column, its extent of development in acres; in the third column, the volume of the Field Operations of the Bureau of Soils in which the report upon the area may be found. Those desiring a detailed description of the soil and of the general conditions which surround it in any particular area may consult these volumes in almost any public library.

Areas of the Dekalb silt loam encountered in the soil survey.

Survey.	Area of soil.	Year of publication, Field Operations.	Survey.	Area of soil.	Year of publication, Field Operations.
Alabama:			Tennessee:		
Colbert County.....	26,368	1908	Grainger County.....	5,952	1906
Etowah County.....	50,176	1908	Greenville area.....	10,560	1904
Jefferson County.....	210,816	1908	Overton County	17,984	1908
Talladega County.....	17,280	1907	Virginia:		
Indiana:			Montgomery County.....	25,792	1907
Scott County	22,080	1904	West Virginia:		
Kentucky:			Middlebourne area	3,712	1907
Madison County	31,424	1905	Parkersburg area	54,592	1908
Warren County	89,408	1904	Spencer area.....	14,748	1909
Ohio:			Wheeling area.....	23,492	1906
Coshocton County.....	320,064				
Meigs County	105,408	1906			
Pennsylvania:					
Center County	46,656	1908			
Johnstown area	46,464	1907			



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